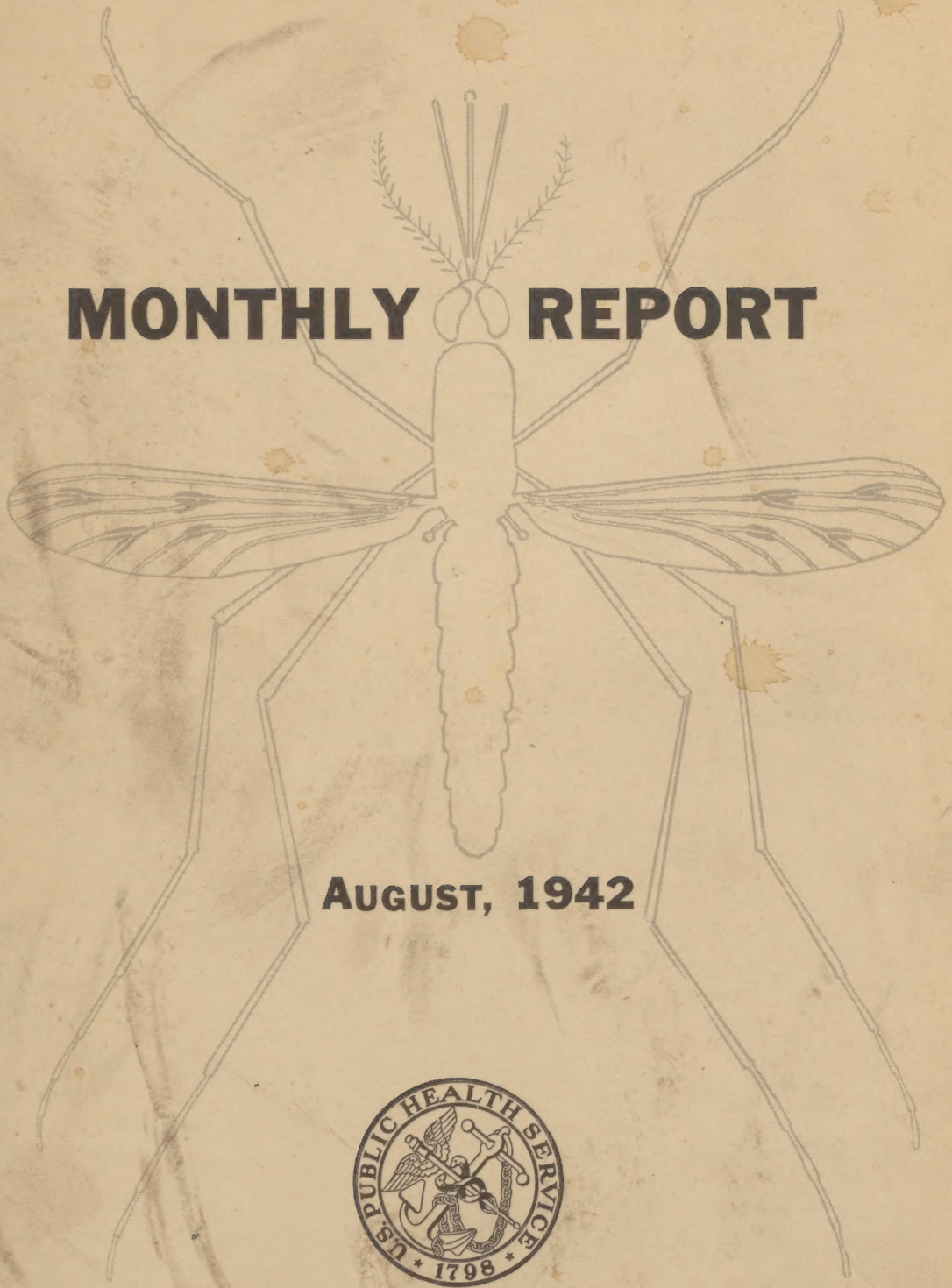
MALARIA CONTROL IN WAR AREAS



MONTHLY REPORT

AUGUST, 1942

FEDERAL SECURITY AGENCY
U. S. PUBLIC HEALTH SERVICE
ATLANTA, GEORGIA

The program Malaria Control in War Areas, a joint undertaking by the Public Health Service and the several State Health Departments, is designed to control production of malaria mosquitoes and reduce potential malaria transmission in extra-cantonment zones of military and essential war industrial areas. Operation of the projects is by the State Health Departments utilizing resources of the Public Health Service. Policy direction is exercised by the Atlanta office of the Public Health Service in collaboration with the Public Health Service Districts involved.

SYLLABUS

The program Malaria Control in War Areas expanded during August so that application of larvicides and minor drainage and clearing operations were carried on in 133 war areas, providing protection for 564 war establishments in 16 states, the District of Columbia, and Puerto Rico. A total of 3395 people were employed. Entomological reports indicate that satisfactory control is being obtained at 91 percent of the war establishments. Larvicidal work was suspended at the end of August in four areas where the density of A. quadrimaculatus was too low to be of sanitary significance and in a fifth area where malaria mosquito control was of little military significance. A major drainage project was inaugurated in the Norfolk, Virginia area.

The extreme difficulty of securing engineers and entomologists is increasing and presents the most serious handicap to the program at the moment, especially in regard to engineers. The number of engineers assigned to the program has been reduced by approximately 50 percent over the past season. Military service continues to call engineering personnel from the program at the rate of about five per month. Replacements cannot be secured. Efforts are being made to recruit practical men in the engineering aide classification to replace trained engineers.

Aedes aegypti mosquito control work was started in three additional war areas in Texas during August. The dog fly control project along the western Florida Gulf Coast is operating successfully in spite of heavier breeding than usual.

The thick film survey program will be started during September. Plans have been formulated for emergency house spraying for adult mosquito control in event of a malaria outbreak in a war area.

A total of approximately $400,000 of Public Health Service funds was encumbered during the month, of which about 82 percent was for personal services.

TABLE I

MALARIA CONTROL IN WAR AREAS

USPHS LARVICIDE AND MINOR DRAINAGE PROJECTS

August 1 - 31, 1942

STATE	Areas in Operation	War Establishments Protected	LARVICIDAL WORK				OTHER WORK			Total Man Hours
			Larvicide Used		Surfaces Treated		Ditching & Cleaning Lin.Ft.	Clearing		
			Oil Gals.	Paris Green Lbs.	Ditches Lin.Ft.	Ponds Sq.Ft.		Ditches Lin.Ft.	Ponds Sq.Ft.	
Alabama	5	28	3,874	---	44,000	5,947,040	41,940	5,315	116,000	9,512
Arkansas	13	24	7,046	1,567	2,845,217	58,429,498	147,398	90,659	4,174,538	25,559
D.C.	1	8	550	---	9,370	28,066	4,960	11,387	16,557	3,627
Florida	8	38	5,279	6,152	47,630	78,972,140	202,102	64,666	702,792	30,080
Georgia	9	34	14	15,496	297,135	75,751,764	35,615	141,454	1,807,465	16,284
Illinois	3	7	2,216	11	274,860	2,555,200	---	---	612,074	2,493
Indiana	2	3	745	850	---	235,795	---	2,300	350,750	2,705
Kentucky	4	20	7,181	2	612,085	23,252,385	2,802	113,500	619,120	10,257
Louisiana*	8	42	113,830	---	16,108,866	191,010,509	8,890	32,118	405,485	67,584
Mississippi	9	23	13,807	6	2,080,731	2,146,724	83,001	218,472	2,988,660	26,845
Missouri	4	11	1,529	101	35,350	10,275,790	---	2,000	416,952	4,042
North Carolina	9	49	22,869	---	4,914,622	20,409,931	175,853	581,455	2,383,351	30,408
Oklahoma	4	10	4,016	---	343,831	6,939,364	24,951	173,640	80,175	7,120
Puerto Rico	6	17	676	4,654	2,053,785	138,253,926	96,525	66,642	389,204	43,934
South Carolina	20	44	53,418	2,039	6,980,023	148,589,934	499,198	564,056	25,150,928	93,010
Tennessee	10	36	15,609	10	2,033,450	15,230,626	24,871	27,432	214,644	15,481
Texas	14	152	37,894	---	4,311,515	53,967,844	472,264	282,464	14,292,893	55,132
Virginia	4	18	16,909	20,920	1,471,695	21,323,420	49,357	1,611,832	43,560	21,675
Total	133	564	307,462	51,808	44,464,165	853,319,956	1,869,727	3,989,392	54,765,148	465,748

*La. 228 Gals. Phenol this period

July 1 -- August 31, 1942										
Alabama	--	--	9,265	---	105,500	12,593,970	63,047	25,307	403,240	19,690
Arkansas	--	--	12,224	2,433	5,248,175	101,192,944	277,222	103,688	4,880,725	47,550
D.C.	--	--	550	---	9,370	28,066	4,960	11,387	16,557	3,627
Florida	--	--	28,932	11,865	2,786,742	196,008,946	464,723	136,159	1,296,187	59,663
Georgia	--	--	46	26,982	513,978	172,217,484	71,820	364,818	6,337,755	31,808
Illinois	--	--	3,337	---	458,205	2,844,250	---	---	1,265,967	4,645
Indiana	--	--	745	850	---	235,795	890	21,550	553,750	4,287
Kentucky	--	--	12,732	2	895,945	51,110,851	4,602	119,400	1,706,230	19,484
Louisiana	--	--	215,429	5,747	31,181,212	539,299,589	10,490	66,018	477,485	129,662
Mississippi	--	--	30,263	6	4,874,627	7,892,529	200,987	737,552	5,264,090	56,769
Missouri	--	--	2,126	229	63,225	16,917,615	150	7,800	614,672	7,481
North Carolina	--	--	44,035	---	10,017,707	38,601,568	372,176	1,358,757	4,654,682	62,373
Oklahoma	--	--	8,133	---	504,684	9,875,991	45,556	198,123	726,119	14,749
Puerto Rico	--	--	1,066	8,270	3,837,238	233,542,841	178,431	115,078	1,037,004	76,437
South Carolina	--	--	104,741	2,074	12,025,946	247,631,060	1,185,547	1,368,298	38,817,435	181,673
Tennessee	--	--	29,626	29	3,611,005	43,567,882	76,962	76,941	342,642	28,515
Texas	--	--	70,435	2,000	8,864,107	130,478,003	662,080	412,522	20,715,207	102,050
Virginia	--	--	27,768	20,920	2,684,888	35,778,455	105,657	2,233,635	2,681,730	41,142
Total	--	--	601,453	81,407	87,682,554	1,841,817,839	3,725,300	7,357,031	91,791,477	891,605

TABLE NO. II

MALARIA CONTROL IN WAR AREAS

NUMBER OF PERSONNEL ON DUTY ON AUGUST 31, 1942 AND TOTAL PAYROLL FOR MONTH OF AUGUST

STATE	TYPE OF PERSONNEL												Percent of Total	
	Commissioned		Prof. & Sci.		Sub-Prof(1)		C. A. F.		Custodial		Total			
	No.	Pay	No.	Pay	No.	Pay	No.	Pay	No.	Pay	No.	Pay	No.	Pay
Alabama	--	---	8	1,858	2	270	2	337	113	10,286	125	12,751	3.7	3.9
Arkansas	--	---	8	1,317	17	2,425	3	457	165	14,169	193	18,368	5.7	5.7
California	--	---	--	---	2	103	1	24	--	---	3	127	0.1	0.1
D. C.	1	285	--	---	2	251	1	120	16	1,492	20	2,148	0.6	0.7
Florida	--	---	8	1,883	12	1,882	4	484	156	14,150	180	18,399	5.3	5.7
Georgia	--	---	7	1,150	28	4,120	3	457	63	5,701	101	11,428	3.0	3.5
Illinois	--	---	3	600	9	1,265	3	457	18	2,820	33	5,142	1.0	1.6
Indiana	--	---	2	433	2	287	1	120	18	1,259	23	2,099	0.7	0.6
Kentucky	--	---	5	950	9	1,137	2	337	47	4,481	63	6,905	1.9	2.1
Louisiana	--	---	8	1,692	30	3,939	3	457	385	33,398	426	39,486	12.5	12.2
Maryland	--	---	1	133	--	---	1	24	22	894	24	1,051	0.7	0.3
Mississippi	--	---	6	1,250	15	2,161	1	120	139	12,495	161	16,026	4.7	4.9
Missouri	--	---	4	933	3	420	2	337	22	1,869	31	3,559	0.9	1.1
North Carolina	--	---	7	1,725	10	1,459	4	541	307	25,796	328	29,521	9.7	9.1
Oklahoma	--	---	2	433	3	487	1	120	35	3,332	41	4,352	1.2	1.3
Puerto Rico	1	*	4	*	9	*	5	*	292	*	311	15,914	9.2	4.9
South Carolina	--	---	9	2,025	22	3,342	3	457	515	45,733	549	51,557	16.1	15.9
Tennessee	--	---	7	1,516	7	1,048	2	337	76	6,926	92	9,827	2.7	3.0
Texas	--	---	10	2,100	47	5,525	4	592	285	25,458	346	33,675	10.1	10.4
Virginia	--	---	4	935	15	2,091	2	337	125	10,384	146	13,747	4.3	4.2
Aedes Aegypti														
Florida	--	---	2	300	29	3,456	2	240	25	2,388	58	6,384	1.7	2.0
South Carolina	--	---	2	167	14	1,476	1	56	--	---	17	1,699	0.5	0.5
Texas	--	---	3	462	3	322	--	---	13	773	19	1,557	0.6	0.5
H. Q. & Dist.(2)	19	6,659	11	3,491	19	2,281	45	5,684	11	633	105	18,748	3.1	5.8
Total	21	6,944	121	25,353	309	39,727	96	12,095	2848	224,437	3395	324,470	100.0	100.0
Percent of Tot.	0.6	2.3	3.6	8.2	9.1	12.9	2.8	3.9	83.9	72.7	100	100		

* Figures not available

(1) Includes Entomological Inspectors

(2) Includes Headquarters and District offices, malaria survey, special investigations and employees temporarily attached to headquarters pending assignment to States.

Monthly Report
Malaria Control in War Areas
August, 1942

The Malaria Control in War Areas larvicidal and minor drainage program continued to expand during August but at a much slower rate than during previous months. During August larvicide and minor drainage operations were controlling malaria mosquito production in 133 war areas, an increase of seven during the month. About 564 war establishments were protected by this work. The number of employees increased by 325 during August making a total of 3395 on the program at the end of the month. About 465,000 man hours of labor were required for this work. Table 1 shows the number of employees and the monthly payroll by states for the month.

Larvicidal Program - Table 2 shows, by states, data on the progress of the larvicidal and minor drainage program. During the month approximately 300,000 gallons of oil and 52,000 pounds of paris green were used to control malaria mosquito production in 8,400 miles of narrow ditches and almost 20,000 acres of ponds and large streams. Minor drainage operations carried on in conjunction with the larvicidal program eliminated or reduced the need for larvicidal treatment of 350 miles of ditches and streams. In addition, some 750 miles of ditches and 1,250 acres of ponds were cleared of debris and vegetation to eliminate breeding places for A. quadrimaculatus or to facilitate larvicidal treatment. The latest entomological reports on catches of adult A. quadrimaculatus indicate that satisfactory control is being obtained at 91 percent of the war establishments covered by the program. In the remaining nine percent the adult A. quadrimaculatus has not yet been reduced to the desired level.

Larvicidal projects in four areas were suspended at the end of August on the basis of entomological surveys which indicated densities of A. quadrimaculatus too low to be of sanitary significance. The four areas are the Biloxi, Gulfport, and Pascagoula areas on the Gulf Coast in Mississippi and the Alcoa-Marysville area in eastern Tennessee. Inspectional service will be continued at all four places but most of the equipment and technical personnel will be transferred to other war areas where the need is greater. Control operations were also discontinued at Gourdin, S. C. because the project was found to be unjustified on the basis of military significance.

A notable development in the larvicidal program during July was the inauguration of airplane dusting of paris green on water areas covered by water chestnut in the vicinity of Fort Belvoir, Virginia. Investigations showed that these areas were the source of prolific A. quadrimaculatus breeding. Light traps at Fort Belvoir produced nightly catches as high as 300 adult A. quadrimaculatus. Since no other method of controlling malaria mosquito breeding in these areas seemed feasible, a contract was awarded for the airplane dusting service and the first dusting of approximately 3500 acres in Virginia, Maryland and the District of Columbia was

completed August 22. The malaria mosquito density at Fort Belvoir was reduced markedly during the first week after dusting began. The use of herbicides to eliminate the water chestnut growth is being considered in connection with next years control operations.

During the latter part of the month the MCWA employees on several of the Texas projects aided in emergency relief work following a hurricane which did considerable damage to towns along one section of the Texas Gulf Coast.

The Headquarters office is now maintaining closer contact with field operations than was possible during the period of rapid expansion and is investigating promptly the areas where high adult mosquito counts are reported at catching stations adjacent to war establishments.

Major Drainage - The large drainage project at Pine Bluff, Arkansas mentioned in last month's report was practically completed during August. Major drainage operations were started at Dam Neck in the Norfolk, Virginia area. Ordinarily this drainage work would be done with heavy power equipment at an estimated cost exceeding $80,000. However, a survey indicated that the work could be accomplished effectively and more efficiently by the use of about 11 tons of dynamite at a cost of about $5,000. The work will consist essentially of eliminating shoals in about three miles of an existing waterway which at present has too flat a hydraulic gradient to drain a large swamp where larvicidal treatment is difficult and expensive. The project should be completed in September.

Conferences between State Health Department and Public Health Service representatives have been held in a number of the states to explain the policies to be followed with regard to major drainage work to be done in various areas after the larvicidal season closes. Due to operating exigencies last spring larvicidal programs in many areas were started without complete plans. However, major drainage projects must be reviewed by the Headquarters office on the basis of necessary plans before operations are approved. To reduce future larvicidal operations and increase efficiency of control special consideration will be given to underground drains, ditches with paved inverts, and filling of swamps and ponds. Necessary materials for such work must be furnished by the local authorities. On major drainage operations, resources of the W.P.A. will be utilized wherever available.

Adult Mosquito Destruction - September is considered a critical month for malaria in continental United States and a study of the periodicity of the cycle of malaria prevalence indicates that 1942 may mark an upward trend in malaria incidence. For these reasons plans have been perfected to supplement existing control work in the event of a malaria outbreak in the vicinity of one or more war areas. This plan includes house spraying with pyrethrum extract for the destruction of house-frequenting adult A. quadrimaculatus. By killing the infected engorged female mosquito the greatest immediate result is obtained.

The Florida Health Department has inaugurated a project of this type in Wakulla County, Florida, the site of an extensive Commando Training Base, and this project will be used as a training center for workers who can be called upon in the event of an epidemic. A mobile emergency unit with complete equipment has been assembled in Atlanta, Georgia which can be dispatched upon a few hours notice.

The house spraying projects at Stuttgart and Newport, Arkansas, mentioned in the July monthly report, are in operation but no results of the work are yet available.

Equipment - Procurement of essential equipment and materials continues to be a difficult problem, especially automotive equipment. A total of 437 trucks and cars are now in operation, an increase of 56 during the month. Of these vehicles, 281 are trucks, 44 are station wagons, and 112 are passenger cars. Approximately 120 additional trucks are essential.

The general situation with respect to equipment and materials is satisfactory. The operations policy is to utilize the simplest types of tools and equipment possible. Control operations in some cases can be done only with special equipment. Power dusting on a large impoundment is an example. It is this type of equipment that has been difficult to procure. New procedures for handling preference rating applications appear to promise some relief. Greater flexibility and increased speed of procurement are expected from the new priority plan.

Personnel - Overshadowing the difficulty of procuring equipment is the problem of obtaining technical personnel, principally engineers and entomologists. During the past month the intensive efforts to recruit men in these two professions have produced no engineers and only two entomologists. About 30 engineering aides have been employed to receive intensive training prior to assignment as replacements for engineers lost to Selective Service. These are practical men without previous experience on engineering problems or mosquito control. Experienced engineers in key positions are being lost and replacements can not be procured.

In California two larvicidal projects which were to have been started in August have been delayed by the shortage of laborers. In that region an annual wage of $1200 for unskilled labor is too low to attract workers who can command higher wages not only in war industries but also, during certain seasons, in agriculture. In other parts of the country this problem is not acute at present.

Dog Fly Control - The dog fly control project in operation along the western Florida Gulf Coast from Pensacola to Carrabelle is operating successfully. This project is a joint undertaking of the Bureau of Entomology and Plant Quarantine and the Public Health

Service. Funds for the work are being furnished by the Army. Entomological reports indicate that the dog fly incidence is no greater than would normally be expented in any agricultural district at this season. Large numbers of flies have not been noted at any point and military personnel seem uniformly pleased with the results of the program.

The principal breeding places for these flies are decaying marine grasses cast up by wave action upon the shore. Breeding is controlled by spraying the grass with a creosote spray containing 25 percent creosote and 75 percent water. Spraying was started on August 18 and during the period August 18-29, 50,000 gallons of spray were applied to 54 miles of grass along 88 miles of shoreline. Deposits of grass are heavier than usual this year and creosote requirements are exceeding the estimated quantities. Considerable difficulty is being experienced in procuring the necessary creosote. In the same general area an estimated 70,000 acres of peanut culture result, after harvest, in stacks of peanut litter which are breeding foci. No control work is to be done on these sources of dog flies because the numbers of flies emerging from them are not considered to be large enough to be of military significance.

Aedes Aegypti mosquito control projects were started at Houston, Galveston, and Corpus Christi, Texas and the four projects begun in June and July continued operation. Excellent results are reported from all of the areas and plans have been completed for extending the control work in the Lower Rio Grande Valley, at present limited to the city of Brownsville, Texas, into two adjacent counties, Starr and Hidalgo. Negotiations with officials of the City of Matamoras, Mexico, across the river from Brownsville have resulted in the inauguration of Aedes aegypti control work in that City. The prevalence of dengue fever in the Lower Rio Grande Valley has made the people aware of the value of Aedes aegypti control and the local authorities and residents have been particularly cooperative.

Thick Film Malaria Survey - Organizational work for the malaria survey continued throughout August and is now almost complete. Approximately 100,000 thick film blood slides will be collected and examined to obtain an index of the malariousness of the war areas in which the MCWA program is active and in other selected areas which will serve as controls. Slides will be taken on grammar school children between the middle of September and the last of October by teams of State and County Health Department representatives. Where State laboratory facilities are available they will be used for the examination of the slides. Additional slides will be examined at the Public Health Service Malaria Investigations Laboratory in Memphis, Tennessee. In so far as it is possible, State facilities, personnel and materials will be used on the survey. The Public Health Service will supplement these where necessary.

In order to expedite the collection of slides, a minimum amount of information will be collected when the slides are taken. Additional information for correlation with the laboratory results will be collected during the winter and all data will be tabulated on punch cards to facilitate statistical analysis. The results of this survey should furnish a most accurate and complete picture of the malariousness of the Southeastern United States.

Malaria Reporting System - A system has been established for the emergency reporting of malaria cases directly to the Atlanta office in order that the office may be kept currently informed of trends in malaria incidence. The State Health Departments have been requested to report weekly on all positive blood slides from residents of war areas. Cards will be furnished to physicians practicing near war areas for reporting weekly all cases of malaria which they see in private practice. Similar reports will be received from various county health officers.

Expenditures - About $392,370 of Public Health Service funds were encumbered during August. The approximate amounts were as follows:

.01 Personal Services	$324,470
.02 Travel	5,000
.03 Transportation of things	5,000
.04 Communication Services	1,150
.05 Rent	660
.07 Other Contractual Services	1,340
.08 Supplies and Materials	41,280
.09 Equipment	13,470
Total	$392,370

Table II summarizes data on the number of employees and payrolls by states.

U.S. PUBLIC HEALTH SERVICE

MALARIA CONTROL IN WAR AREAS

Counties in which Mosquito Control Work is in Operation or Proposed.

Sept. 1, 1942